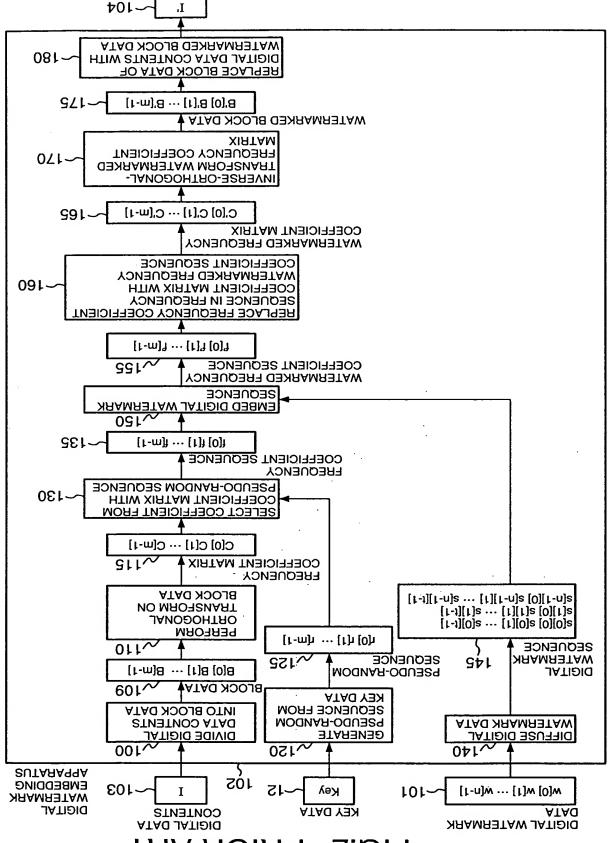


TAA AOIA9 S.DI7



WATERMARKED DIGITAL DATA CONTENTS

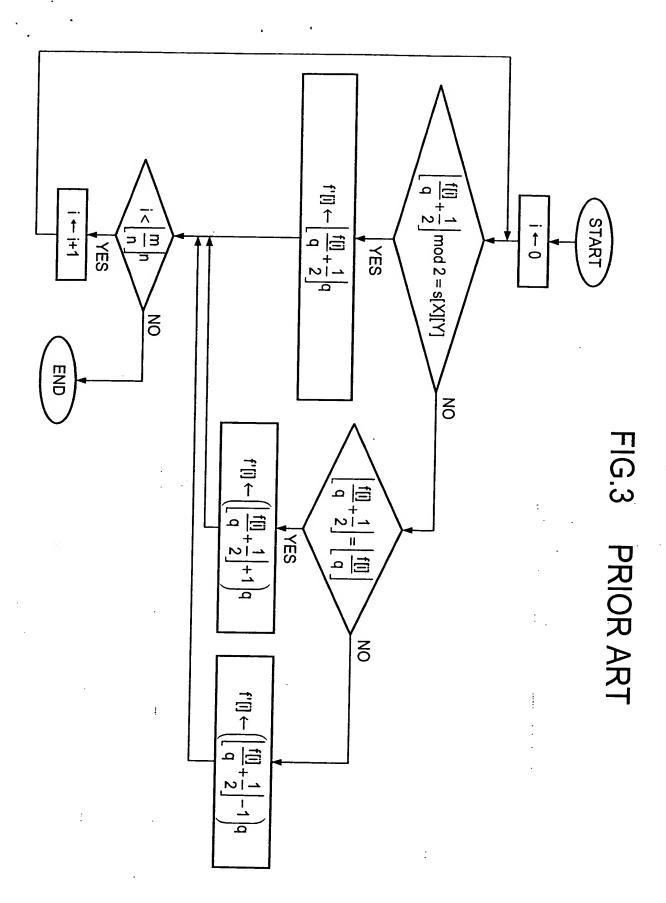
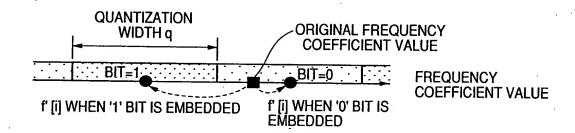


FIG. 4 PRIOR ART



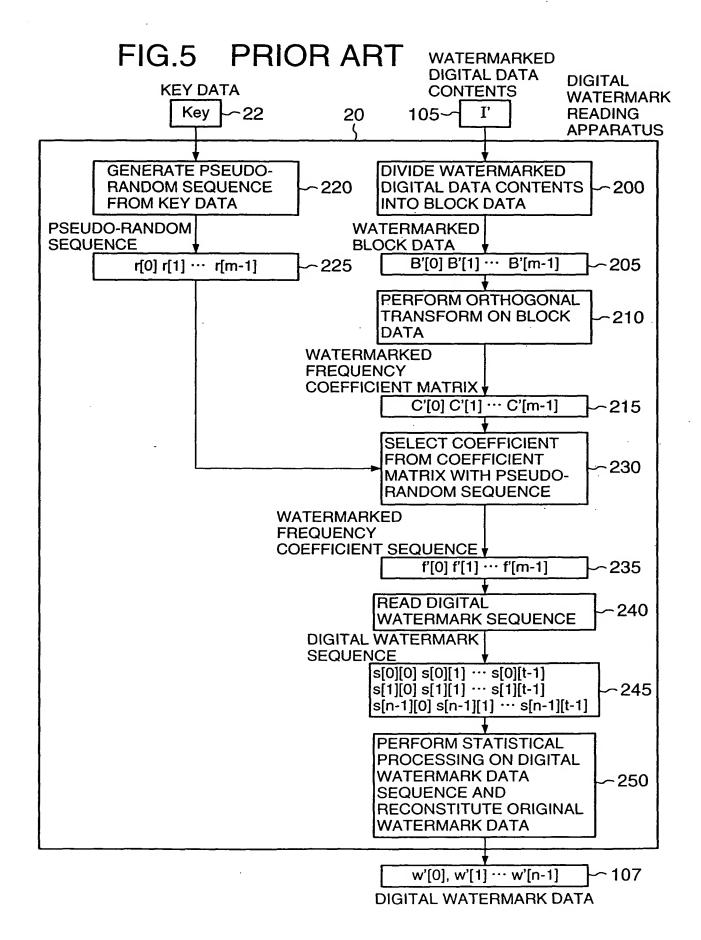


FIG.6 PRIOR ART

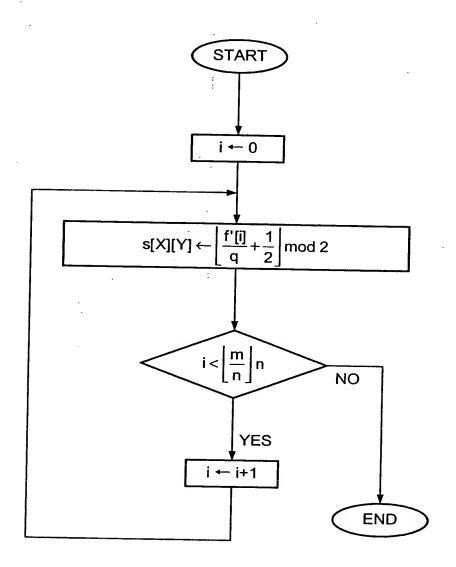


FIG.7

101
12
103

DIGITAL KEY DATA

DIGITAL DATA CONTENTS

DIGITAL WATERMARK
EMBEDDING APPARATUS

103

103

104

105

107

107

108

109

109

109

100

WATERMARKED DIGITAL DATA

CONTENTS

~104

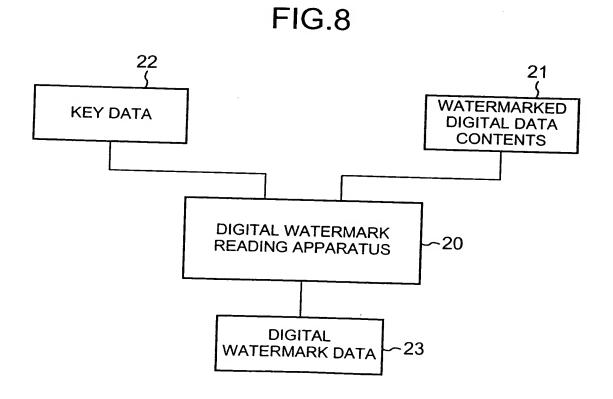
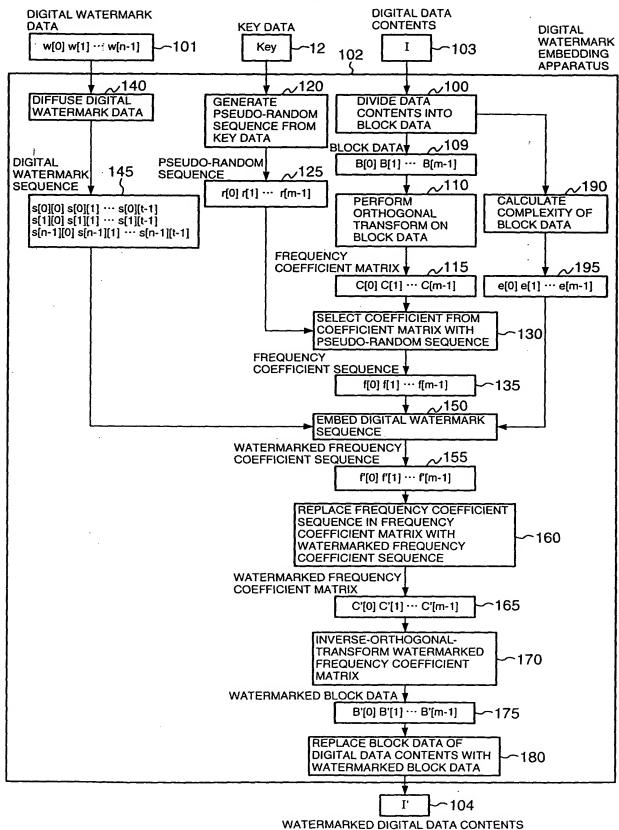
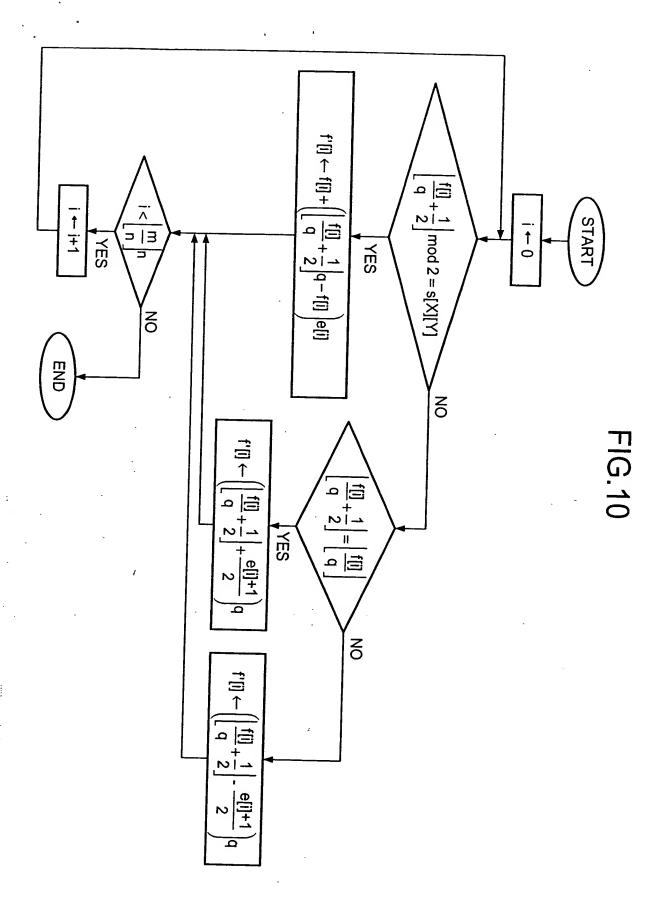


FIG.9





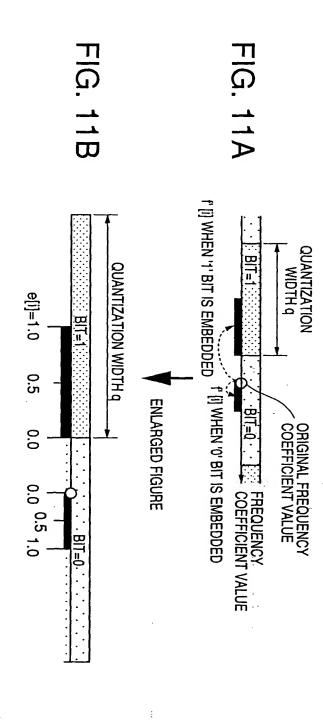
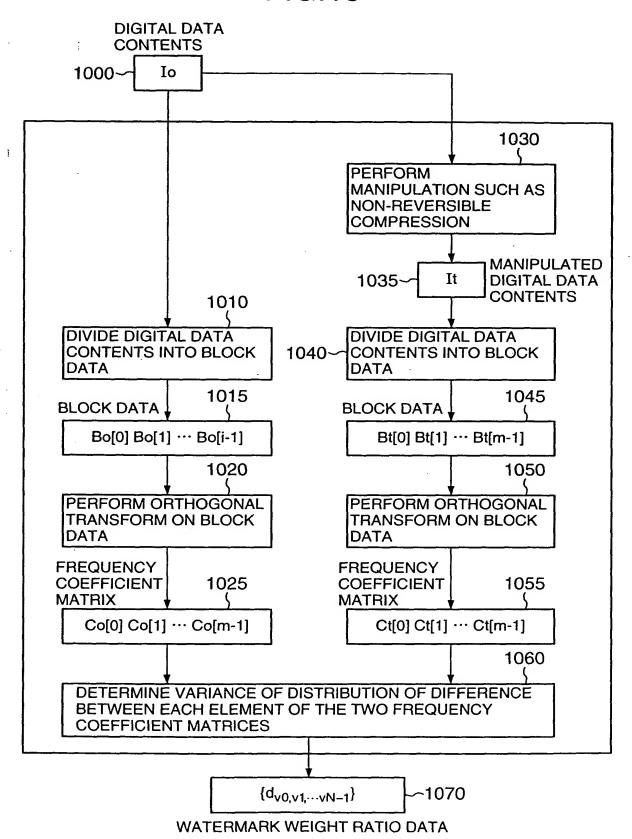


FIG.12 START count ← 0 $v[0] \leftarrow 0, v[1] \leftarrow 0,...,v[N-1] \leftarrow 0$ $|h_{v(0),v(1),\dots,v(N-1)}| \ge \Delta$ count ← count+1 NO v[0] < M[0]YES v(0) ← v(0)+1 NO v[1] < M[1] YES v(1) ← v(1)+1 v[N-1] < M[N-1] $V(N-1) \leftarrow V(N-1)+1$ NO count≧Γ YES $e[i] \leftarrow \frac{\overline{count}}{-}$ END

FIG.13



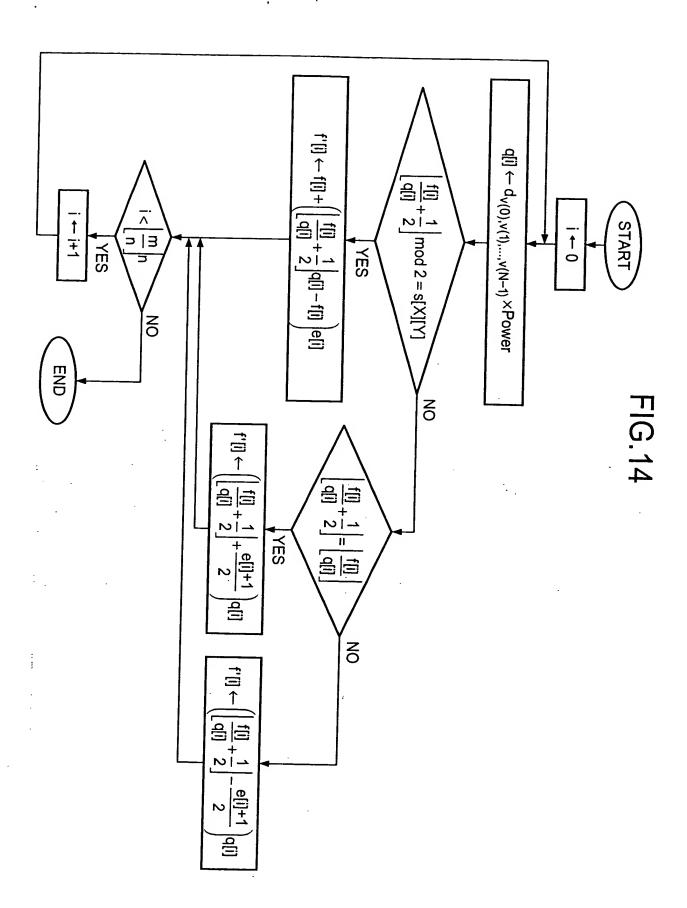
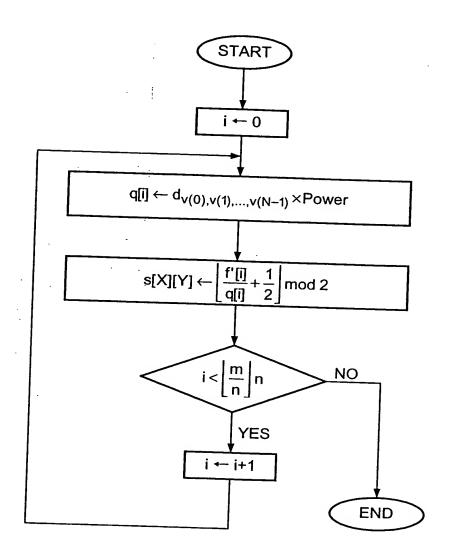


FIG.15



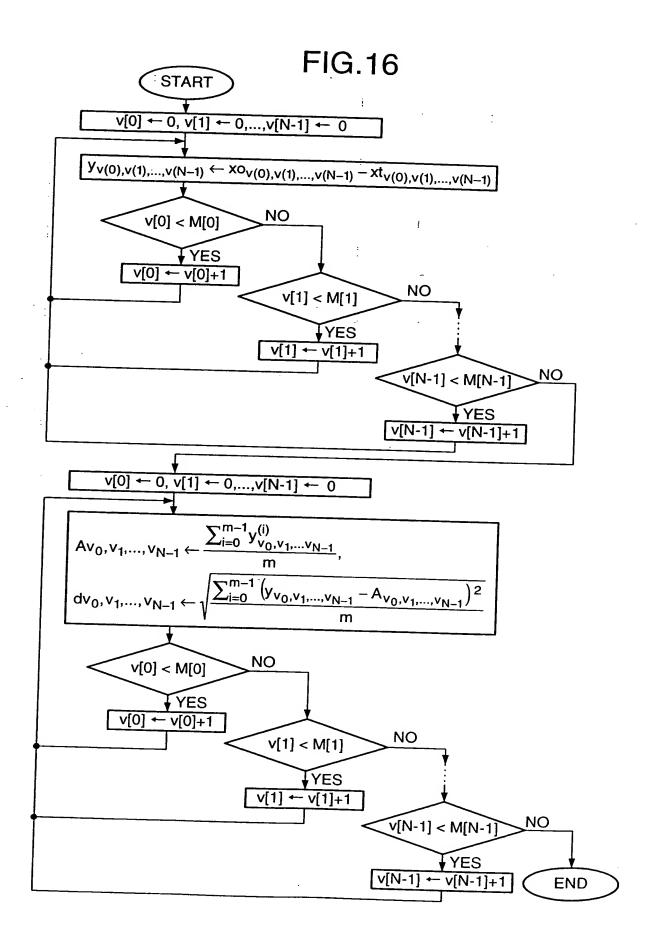


FIG.17

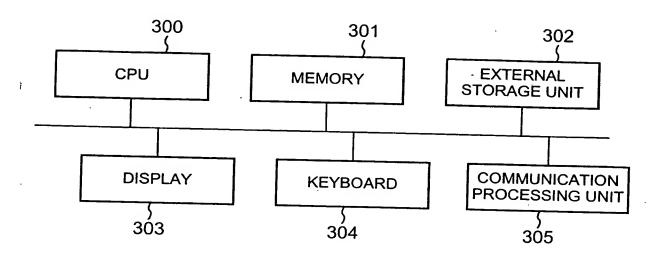
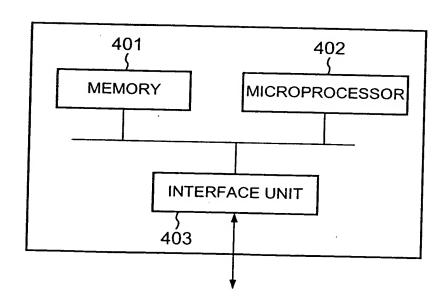
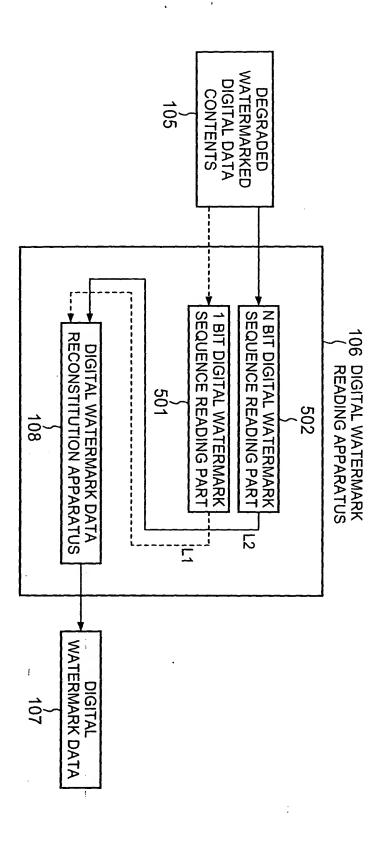


FIG.18



WATERMARK DATA CONTENTS DEGRADED WATERMARKED DIGITAL DATA CONTENTS DIGITAL 101 103 105 **EMBEDDING APPARATUS** DIGITAL WATERMARK DISTRIBUTED BY WIRELESS, WIRE COMMUNICATION, OR PACKAGED MEDIUM RECONSTITUTION APPARATUS DIGITAL WATERMARK DATA DIGITAL WATERMARK READING APPARATUS 102 108 106 WATERMARKED DIGITAL DATA CONTENTS DIGITAL WATERMARK 104 DATA 107

FIG.19



1G.20

FIG.21

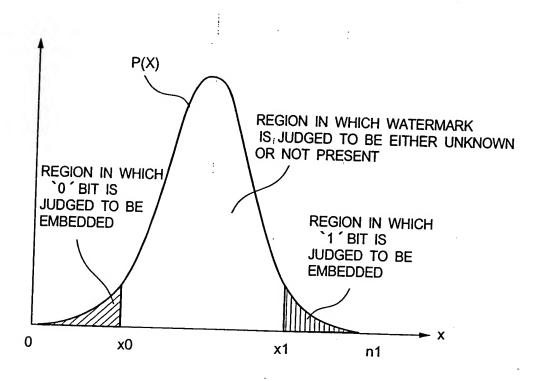


FIG.22

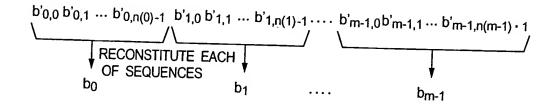
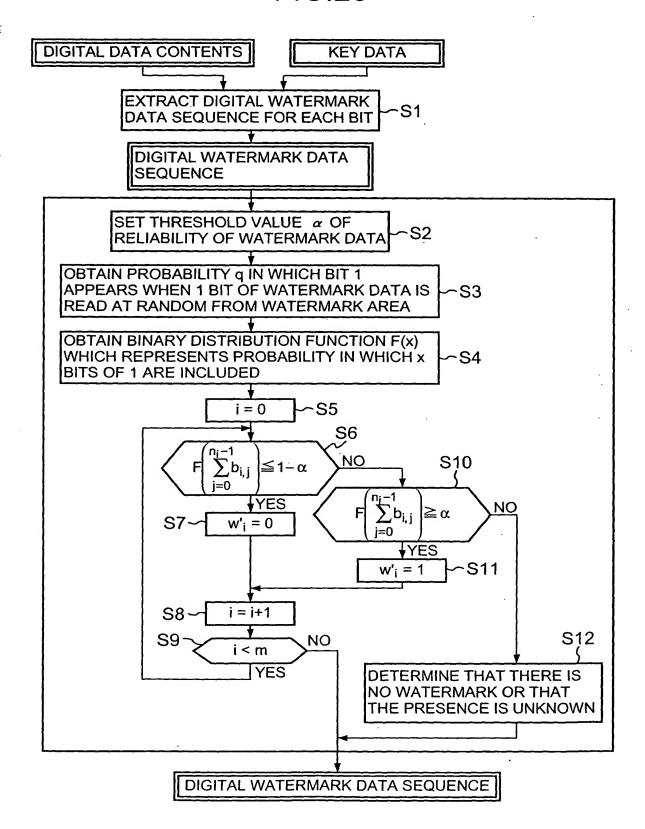


FIG.23



WATERMARK DATA DIGITAL DATA CONTENTS DEGRADED WATERMARKED DIGITAL DATA CONTENTS DIGITAL 3 103 105 SEQUENCE GENERATOR(A) EMBEDDING APPARATUS DIGITAL WATERMARK 102 PROVIDED INSIDE **PSEUDO-RANDOM** COMMUNICATION, OR PACKAGED MEDIUM -----RECONSTITUTION APPARATUS **DIGITAL WATERMARK DATA** DIGITAL WATERMARK READING APPARATUS 601 PROVIDED INSIDE PROVIDED INSIDE 106 WATERMARKED DIGITAL DATA CONTENTS -108DIGITAL WATERMARK 104 DATA 107

FIG.24

SEQUENCE GENERATOR(B)

PSEUDO-RANDOM

FIG.25

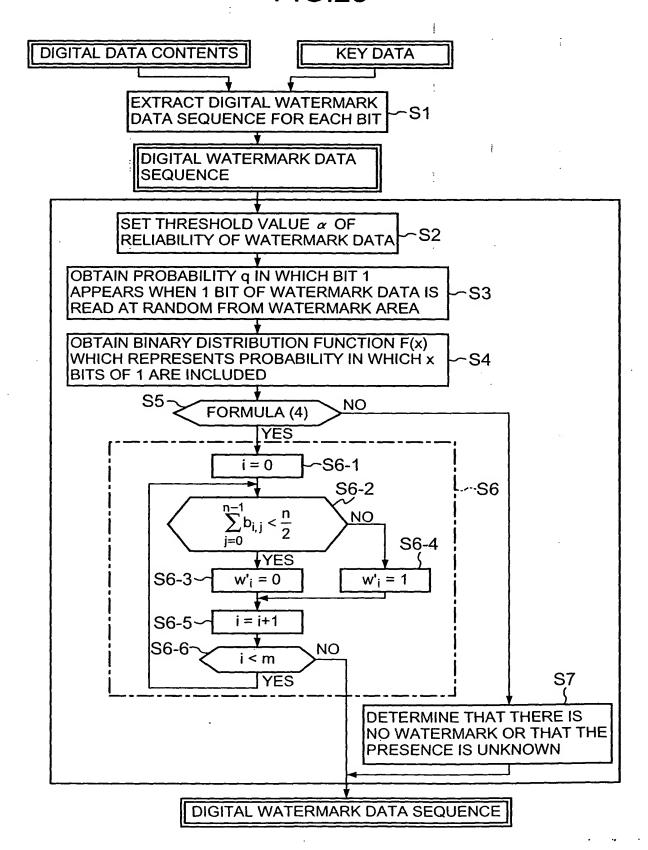


FIG.26 START GENERATE {r'i,i} FROM KEY DATA **S8** SET THRESHOLD VALUE α OF **S2** RELIABILITY OF WATERMARK DATA OBTAIN PROBABILITY q IN WHICH BIT 1 APPEARS WHEN 1 BIT OF WATERMARK DATA IS **S**3 READ AT RANDOM FROM WATERMARK AREA OBTAIN BINARY DISTRIBUTION FUNCTION F(x) WHICH REPRESENTS PROBABILITY IN WHICH X BITS OF 1 ARE INCLUDED ~S9 i = 0YES i = 0**S5** NO j < n $b'_{i,j} = b_{i,j} \oplus r'_{i,j}$ NO FORMULA (4) j = j+1YES i = i+1i = 0NO i < m YES $\sum_{j=1}^{n-1}b'_{i,j}<\frac{n}{2}$ NO YES $w'_i = 0$ $w'_i = 1$ S6~~ i = i+1NO i < mYES DETERMINE THAT THERE IS NO WATERMARK OR THAT THE PRESENCE IS UNKNOWN **S7 END**

FIG.27

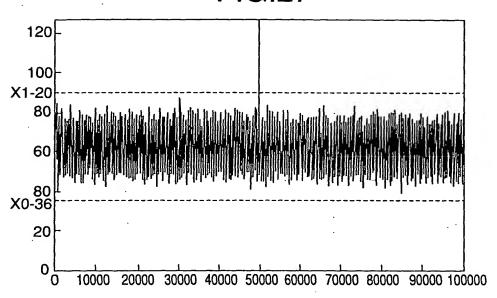


FIG.28

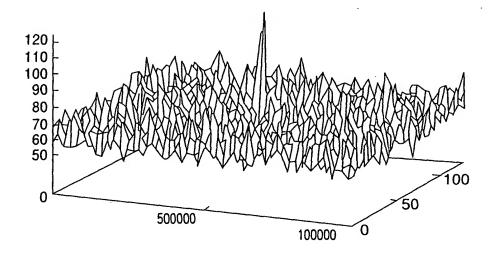


FIG. 29 PRIOR ART

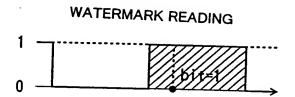


FIG.30

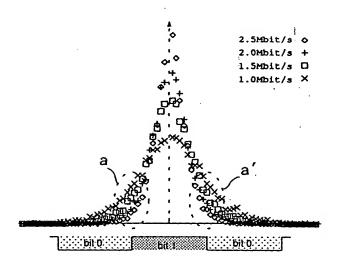


FIG. 31

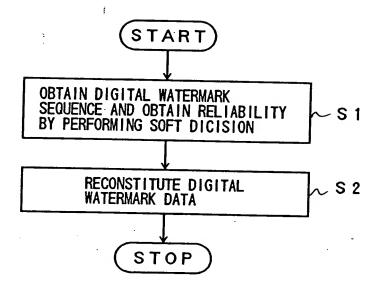


FIG. 32

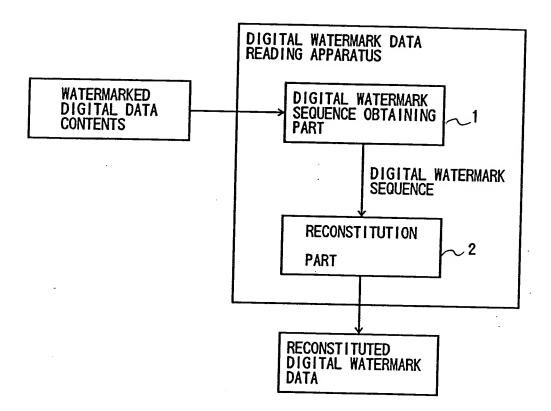


FIG. 33

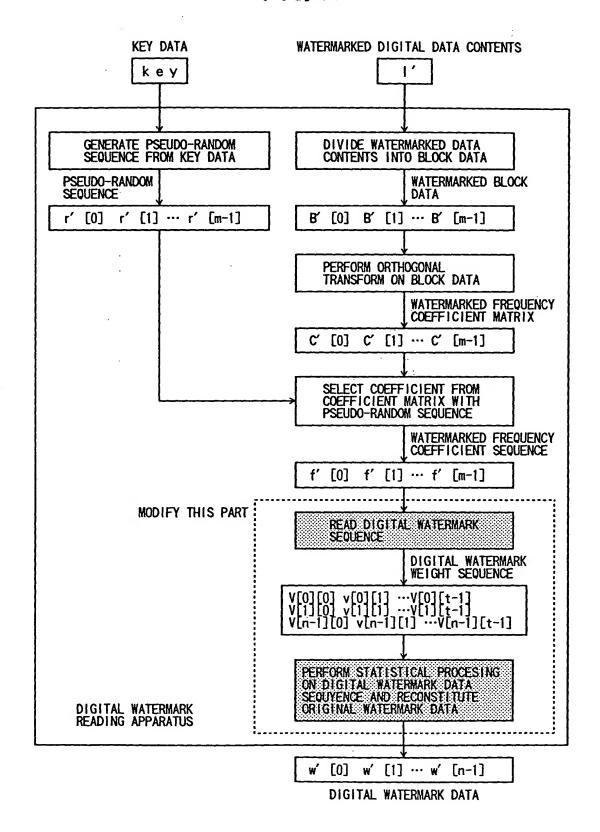


FIG.34

